

Patent claims

1. A directional loudspeaker, comprising a sound source for producing highly directional sound which is formed by at least one ultrasound loudspeaker, with a pivotable reflector being provided for deflecting the directional sound, characterized

in that the reflector can be pivoted such that it serves as mechanical protection for the directional loudspeaker's sound source, particularly against environmental influences such as soiling and moisture.

2. The directional loudspeaker as claimed in claim 1, characterized

in that the directional loudspeaker's sound source is situated in a housing which can be sealed by the reflector.

3. The directional loudspeaker as claimed in claim 2, characterized

in that the wall of the housing has a circular cross section.

4. The directional loudspeaker as claimed in either of claims 2 and 3, characterized

in that the reflector is moveably connected to the housing by a joint.

5. The directional loudspeaker as claimed in claim 4, characterized

in that the joint is mounted on the wall of the housing such

that it can be moved along the top of the wall.

6. The directional loudspeaker as claimed in one of claims 2 to 5,

characterized

in that the housing itself is mounted so that it can tilt and/or pivot with respect to its support.

7. The directional loudspeaker as claimed in claim 6,

characterized

in that the housing comprises an outer housing and an inner housing,

in that the reflector is moveably connected to the inner housing via a joint, and

in that the inner housing is mounted so that it can tilt and/or pivot with respect to the outer housing.

8. The directional loudspeaker as claimed in one of the preceding claims,

characterized

in that the directional loudspeaker's sound source is formed by a plurality of ultrasound loudspeakers which are arranged to form an array, the individual ultrasound loudspeakers being arranged so as to be inclined at an angle relative to one another such that their collective radiation is focused.

9. The directional loudspeaker as claimed in one of the preceding claims,

characterized

in that the directional loudspeaker is connected to a means for

locating people or objects who/which are intended to receive the directional ultrasound signal.

10. The directional loudspeaker as claimed in claim 9, characterized in that the means for locating people or objects is situated in or on the housing of the directional loudspeaker.

11. The directional loudspeaker as claimed in either of claims 9 and 10, characterized in that the means for locating people or objects is able to locate a laser or a radio signal using its emitted light signal or radio signal.

12. The directional loudspeaker as claimed in claim 11, characterized in that the means for locating people or objects is arranged such that it receives the beam of light from the laser via the latter's deflection on the directional loudspeaker's reflector.

13. The directional loudspeaker as claimed in one of the preceding claims, characterized in that a means is provided which can be used to orient the directional loudspeaker specifically to people or objects who/which are intended to receive sound.

14. The directional loudspeaker as claimed in claim 13, characterized

in that the directional loudspeaker comprises, as additional means, a laser which is arranged in the directional loudspeaker's housing and illuminates the people or objects by means of beam deflection on the directional loudspeaker's reflector.

15. A method for operating a directional loudspeaker, in which highly directional sound is emitted from a sound source via at least one ultrasound loudspeaker, the emitted sound being deflected by means of a reflector, characterized in that the sound source is mechanically protected by pivoting the reflector such that it closes it off particularly from environmental influences such as soiling and moisture.

16. The method as claimed in claim 15, characterized in that the people or objects to whom/which the directional ultrasound is emitted are located, and consequently the reflector is oriented suitably for the purpose of radiating to this locality.

17. The method as claimed in claim 16, characterized in that location is effected on the basis of a laser beam or a radio signal, which is sent by a laser or radio, situated at the location which is to be located, to a laser light receiver associated with the directional loudspeaker, said receiver being able to infer the location of the light source from the received light

signal.

18. The method as claimed in one of the preceding claims, characterized in that to assist the specific orientation of the directional loudspeaker the people or objects who/which are situated in the current direction of the main ray from the directional loudspeaker are specifically illuminated.

19. The method as claimed in claim 20, characterized in that the specific illumination is effected using a laser.

20. The use of the apparatus or of the method as claimed in one of the preceding claims for sending sound to people or objects in the interior of vehicles.

21. The use of the apparatus or of the method as claimed in one of the preceding claims for sending sound to people or objects in the external surroundings of vehicles.